

Appl. No. 10/604,599
Amdt. dated July 6, 2006
Reply to Office action of May 9, 2006

REMARKS/ARGUMENTS

Claims 21-40 are rejected under 35 U.S.C 112, as failing to comply with the written description requirement.

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For the rejection of claimed limitation "both of the target color element and the color element of the output color relate to the same component, that is the R, G, or B component" was not described in the specification, this rejection is respectfully traversed. The following discussion will indicate that all of the limitations comprised by the color conversion apparatus of claim 21 are disclosed by the current specification.

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Applicant's claim 21 recites:

21. (Previously Presented)

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A color conversion apparatus for converting an input color being in a first color space to an output color being in a second color space, wherein both the input color and the output color include a plurality of color elements, the apparatus comprising:

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a first lookup table being coupled to a first color element of the input color for outputting a corresponding first converted color element;

a second lookup table being coupled to a second color element of the input color for outputting a corresponding second converted color element; and

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an adder circuit being coupled to the first lookup table and the second lookup table for summing the first converted color element, the second converted color element and a target color element to thereby generate a color element of the output color;

wherein both of the input color and the output color are in a RGB format including R, G, and B components respectively representing red, green, and blue colors, and both of the target color element and the color element of

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the output color relate to the same component, that is the R, G, or B component.

(Emphasis added)

5 In order to make the expression clearly, the following paragraphs are taking one by one comparison between the independent claim 21 and an embodiment of the presented invention in current specification.

10 "a first lookup table being coupled to a first color element of the input color for outputting a corresponding first converted color element;"

Please refer to Fig.4 and paragraph [0036], lines 10-14 of the presented specification "The first green value G is connected to the gamma correction circuit 32, g1 lookup table 34, and the g3 lookup table 44...The output of the g1 lookup table 34, which is the result of the multiplication of $G \cdot g1$." From this description, the claimed limitations of the first
15 lookup table could be corresponding to g1 lookup table 34, the first color element of the input color could be corresponding to green value G and the first converted color element could be corresponding to the output of the g1 lookup table 34 which is the result of the multiplication of $G \cdot g1$. All limitations are disclosed in specification.

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"a second lookup table being coupled to a second color element of the input color for outputting a corresponding second converted color element;"

Please refer to Fig.4 and paragraph [0036], line 11-15 of the presented specification
25 "Finally, the first blue value B is connected to the gamma correction circuit, the b1 lookup table 36, and the b2 lookup table 40...the output of the b1 lookup table 36, which is the result of the multiplication of $B \cdot b1$." From this description, the claimed limitations of the second lookup table could be corresponding to b1 lookup table 36, the second color

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element of the input color could be corresponding to green value B and the second converted color element could be corresponding to the output of the b1 lookup table 36 which is the result of the multiplication of $B \cdot b1$. All limitations are disclosed in specification.

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"an adder circuit being coupled to the first lookup table and the second lookup table for summing the first converted color element, the second converted color element and a target color element to thereby generate a color element of the output color"

10 Please refer to Fig.4 and paragraph [0036], line 13-16 of the presented specification "The output of the g1 lookup table 34, which is the result of the multiplication of $G \cdot g1$;...The output of the first adder 46 is the second red value R' ". From this description, the claimed limitations of adder circuit could be corresponding to the adder
15 table 34 and lookup table 36 respectively, the first converted color element and the second converted color element could be corresponding to the output of the g1 lookup table 34 and the output of the b1 lookup table 36 respectively, the target color element could be corresponding to gamma corrected R-Value $r1\text{-gamma}$, and the color element of the output color could be corresponding to the second red value R' . Their interconnection and
20 functionality are also described in the referral paragraph.

"wherein both of the input color and the output color are in a RGB format including R, G, and B components respectively representing red, green, and blue colors"

25 Please refer to Fig.4 and paragraph [0036], line 2-4 of the presented specification "The color conversion apparatus 30 converts a first color having red, green and blue values (R, G, B) in a first color space to a second color having second red, green and blue values (R' , G' , B') in a second color space.". From this description, the claimed limitations of the

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input color and the output color are in a RGB format including R, G, and B components respectively representing red, green, and blue colors are disclosed.

5 "both of the target color element and the color element of the output color relate to the same component, that is the R, G, or B component"

Please refer to Fig.4 and paragraph [0036], line 15-22 of the presented specification "the gamma corrected R-Value $r1\text{-gamma}$ are added together by the first adder46. The output of the first adder 46 is the second red value R' ...and the gamma corrected B-value
10 $b3\text{-gamma}$ to produce the second green value B' .". According to this description, the limitation of target color element could be corresponding to gamma corrected R-Value ($r1\text{-gamma}$), the limitation of color element of the output color could be corresponding to the second red value R' , and these two elements (R-Value, value R') all belong to red component. Similarly, if the limitation of target color element is corresponding to gamma
15 corrected G-value ($g2\text{-gamma}$), and the limitation of color element of the output color is corresponding to the second green value G' , these two elements (G-Value, value G') also belong to green component. Finally, if the limitation of target color element is corresponding to gamma corrected B-value ($b3\text{-gamma}$), and the limitation of color element of the output color is corresponding to the second blue value B' , these two
20 elements (B-Value, value B') also belong to blue component.

From the foregoing comparison between claimed limitation and description in specification, all the limitation of independent of claim 21 and the claimed limitation
25 "both of the target color element and the color element of the output color relate to the same component, that is the R, G, or B component" have been disclosed in specification, and the applicants respectfully request reconsideration and withdrawal of this objection since it is not violate the requirement of 35 U.S.C 112.

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Claims 21-40 are rejected under 35 USC 103(a), which forms the basis for all obviousness rejections.

In order to overcome the non-obviousness rejection of 35 USC 103(a) over Lee (US
5 2003/0234795) in view of Champion et al (6,774,953), applicants provide the following reasons:

- (a) Lee fails to disclose the features of this claimed invention
- (b) Champion et al fail to disclose the features of this claimed invention
- 10 (c) The prior art references do not contain any suggestion that they be combined
- (d) The combination of Lee and Champion et al would produce unpredictable error operation

(a) Lee fails to disclose the features of the claimed invention

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In Lee's invention, which aim to provide a solution to convert YUV color format to RGB color format that is quite different from our claimed invention, the claimed features "input color and the output color are in a RGB format" and "the target color element and the color element of the output color relate to the same component" were not disclosed
20 and taught in Lee reference, and there is no reasonable motivation that Lee have to utilize these two claimed features to complete the color conversion. Furthermore, the applicant's consider that Lee's invention is processing the color conversion between two different color spaces (YUV to RGB) and the presented invention is processing the color conversion in the same color space (RGB to RGB), these two color conversions belong to
25 different invention purposes. Thus, the person ordinary skill in the relevant art at the time will not create the presented invention over the Lee's reference.

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(b) Champion et al fail to disclose the features of this claimed invention

Otherwise, in the Champion et al, although it disclosed (fig.3) the RGB to RGB color conversion, two look-up tables and adders, but failed to disclose the features of “an
5 adder circuit for summing the first converted color element, the second converted color element and a target color element to thereby generate a color element of the output color”, and “the target color element and the color element of the output color relate to the same component”.

Regarding the features of the claimed invention, the adder sums three color
10 components which are first converted color element, second converted color element and target color element, wherein the first and second converted color element are outputted by look-up tables. Oppositely regarding the reference of Champion et al (fig.3), the adder (316) only sums two color elements, wherein only one color element (308) is outputted by look-up table (306), and the other color element (314) is outputted by 3x3 matrix
15 calculator (312). Thus, the third color component (target color element) in the claimed invention is the champion et al didn't provide and teach, and the claimed feature “the target color element and the color element of the output color relate to the same component” is the champion et al didn't provide and teach as well.

By a further comparison with the Champion et al (fig.3) and the claimed invention, it
20 can find that the invention of Champion et al is using the look-up tables, adders and a 3x3 matrix calculator (312) including multipliers to complete the color conversion, but in this presented invention is mainly to use two look-up tables and adder circuits summing three color elements to complete the color conversion, wherein two color elements (first and second color elements) are outputted by look-up tables. Therefore, the apparatus and
25 method of claimed invention will get the more advantage over than Champion et al because of the 3x3 matrix calculator (312) utilizes the multipliers to calculate the corrections (The formula of column 6, line 35) that will cost lager hardware requirement and reduce the converted speed.

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(c) The prior art references do not contain any suggestion that they be combined

With regard to the combination of Lee and Champion et al, it is well know that in order for any prior art references themselves to be validly combined for use in a prior art
5 under 103 rejection, the references themselves must suggest that they be combined. E.g., as was stated in In re Sernaker, 217 U.S.P.Q. 1,6 (C.A.F.C 1983):

“Prior art references in combination do not make an invention obvious unless something in the prior art references would suggest the advantages to be derived from
10 combining their teachings.”

As was further stated in W.L.Gore & Associates, Inc. v. Garlock Thomas, Inc., 721 F.2d 1540, 1551 (Fed. Cir. 1983):

15 “The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this [invention] should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. ...Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure... In determining whether such a suggestion
20 can fairly be gleaned from the prior art, the full field of the invention must be considered.”

According to the above-mentioned quotation from Federal Circuit, the combination must be suggested in the prior art references that would make the invention obvious, but
25 in the present case, there is no reason given in the last O.A to support a proposed combination, and there is no suggestion in Lee and Champion et al to make the combination. Accordingly, applicants submit that the combining from Lee and Champion et al is unobvious and improper.

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(d) The combination of Lee and Champion et al would produce unpredictable error operation

However even if the combination of Lee and Champion et al were legally justified,
5 the independent claim 21 still have unobvious features over the proposed combination.
Otherwise, applicants consider that making combination from Lee and Champion et al
would produce error operation. The following possible combination were presumed by
applicants:

- 10
1. The output of Lee is coupled to the input (fig. 3) of Champion et al
 2. The input of Lee is coupled to the output (fig. 3) of Champion et al
 3. The adder circuit of Lee replaces the adder circuit of Champion et al

(First combination)

15 In first combination, "The output of Lee is coupled to the input (fig.3) of Champion
et al", applicants presumed the first possible combination that utilizing the output (R, G, B)
of Lee couple to the input (R', G', B') of Champion et al, this combination makes the
combinative apparatus operative, the input color elements of the combinative apparatus
are YUV color elements, and the output of the combinative apparatus are RGB color
20 elements. In this combination, applicants provide two possible situations for discussion as
follows:

(First situation)

25 In first situation, if the adder of claimed invention is corresponding to the adder
(315) of Lee, the first lookup table of claimed invention is corresponding to the color
lookup table (301) of Lee, the second lookup table of claimed invention is
corresponding to the color lookup table (305), the target color element of the claimed
invention is corresponding to output of color lookup table (305), the input color of

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5 claimed invention is corresponding to input color (YUV) of Lee and the output color of claimed invention is corresponding to output color (RGB) of Champion et al, the combinative apparatus still at least hasn't the feature of "input color and the output color are in a RGB format". This is because that the combinative apparatus becomes a YUV to RGB color conversion apparatus. Therefore, even if the two references, Lee and Champion et al, can be properly combined, the claimed invention still at least has the feature that the combinative apparatus does not contain, and the claimed invention is patentable over Lee and Champion et al if taking the first situation into account.

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(Second situation)

15 In second situation, if the adder of claimed invention is corresponding to the adder (316) of Champion et al, the first lookup table of claimed invention is corresponding to the primary lookup table (306) of Champion et al, the second lookup table of claimed invention is corresponding to the secondary lookup table (320), the input color of claimed invention is corresponding to input color (YUV) of Lee and the output color of claimed invention is corresponding to output color (RGB) of Champion et al, the combinative apparatus still at least hasn't the features of "input color and the output color are in a RGB format", "an adder circuit for summing the first converted color element, the second converted color element and a target color element to thereby generate a color element of the output color" and "the target color element and the color element of the output color relate to the same component". In second situation, the combinative apparatus is still a YUV to RGB color conversion apparatus, the feature of "input color and the output color are in a RGB format" is the combinative apparatus does not contain. Furthermore, the adder (316) only adds two color elements, and there is no third color element (target color element) being added into the adder (316). Therefore, the features of "an adder circuit for summing the first converted color element, the second converted color element and a target color

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element to thereby generate a color element of the output color” and “the target color element and the color element of the output color relate to the same component” are the combinative apparatus does not contain.

5 **(Second combination)**

Regarding second combination, “The input of Lee is coupled to the output (fig. 3) of Champion et al”, applicants presumed the second combination that utilizing the input (Y, U, V) of Lee couple to the output (R, G, B) of Champion et, this combination would make the combinative apparatus producing error operation due to the RGB and YUV belong to
10 two different color spaces and it is impossible that the output RGB value would be a correct value if reluctantly utilizing the second combination method. Therefore, it will become an un-meaningful and invalid apparatus if taking the second combination method.

(Third combination)

15 Furthermore, even taking the third combination, “The adder circuit (315) of Lee replaces the adder circuit (316) of Champion et al”, this combination would also make the combinative apparatus producing error operation. This is because that the original adder (316) of Champion et al only has two input nodes, but the adder (315) has three input nodes. Therefore, the combinative apparatus would generate a floating node if the adder
20 (316) is replaced by adder (315) and there is no suggestion that how to connect the third input of the adder 316 in the reference of Champion et al. Similarly, the combinative apparatus would also become an un-meaningful and invalid apparatus if taking the third combination method.

25 After the discussion for three kinds of combinations, it is clear that even if the two references, Lee and Champion et al, can be properly combined, and the combinative apparatus is operative, the claimed invention still has the features that the combinative apparatus does not contain and the two references do not render the invention as a whole

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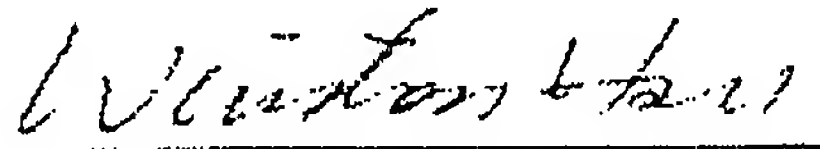
obvious. Otherwise, in second and third presumed combination, the combinative apparatus would produce unpredictable error operation, which also proves that the combination from Lee and Champion et al is very difficult and unobvious. Therefore, applicants submit that the combination from Lee and Champion et al is un-suggested and
5 improper and the claimed invention is patentable over the two references.

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CONCLUSION

For all above reasons, which regarding the independent claim 21 for overcoming the non-obviousness rejection with four reasons: (a) Lee fails to disclose the features of the claimed invention, (b) Champion et al fail to disclose the features of this claimed invention, (c) The prior art references do not contain any suggestion that they be combined, and (d) The combination of Lee and Champion et al would produce error operation. Others independent claim 31 and dependent claims pertain to independent claim 21 and claim 31 also have the same reasons for overcoming the non-obviousness rejection. Applicants respectfully request the reconsideration and allowance of the claimed invention over Lee in view of Champion et al, and which action they respectfully solicit.

Sincerely yours,



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